

## **INTERVIEW WITH SVANTE PÄÄBO**

**Professor Pääbo, you are the founder of paleogenetics and have researched the DNA of the Neanderthal. In 2022, you received the Nobel Prize on the grounds that you had achieved something seemingly impossible with your research. Why was this considered impossible?**

Twenty years ago, I would have said myself that it would remain impossible to decode the genome of the Neanderthal. But like so many things in science, our research is technology-driven. The technology of how to sequence DNA has developed very rapidly, and we have been fortunate to be able to use, modify, and apply these methods to ancient DNA from Neanderthal bones.

**Did you ever have any doubts about whether it was worthwhile to continue research?**

I was driven by the idea of going back in time and tracing the course of evolution. However, there were many problems along the way, for example, contamination with modern human DNA, so we had to work on animals like mammoths and giant sloths for a few years. That was fundamentally less interesting to me, but it was a way to be able to go back in time, at least in some cases, and develop techniques to move forward in the process. At such times, the big goal was always something that I and the working group clung to.

**Before you, no one had ever tried to sequence the DNA of a mummy.**

At the beginning of the 1980s, we all believed that DNA degrades very quickly after death. But then we found out that DNA is degraded into small fragments and chemically modified, but that under certain conditions, it can survive for hundreds of thousands of years.

**Your mother took you to Egypt when you were 13 years old and sparked your interest in the past. This fascinated you so much that you even studied Egyptology at first, but that was too boring for you.**

I had a very romantic interest in archaeology, and the trip to Egypt was a huge experience for me. Sites where the ground had pottery shards from old vessels from Roman times or even earlier, fascinated me very much. I then spent two years in a row during summer vacations at the Egyptian Museum in Stockholm, and from one year to the next almost nothing changed. The same people sat at the same desks and did almost the same things. I just couldn't imagine a future like that for myself.

**You are the illegitimate son of the biochemist Sune Bergström, who also won the Nobel Prize. Only after his death did the world learn that he had a second family: Your mother and you. Did this biography shape your unusual thinking?**

It was definitely something special to grow up as an only child. I was taken very seriously by my mother at a very early age. She made time for my interests and visited archaeological sites around Stockholm with me on weekends. My father was only there for a few hours on Saturdays for coffee or walks in the woods and didn't want to talk about personal things. As a child I found this quite natural, only as a teenager there were a couple of big fights. I yelled at my father because his other family didn't know about us. I even considered taking the initiative and contacting the other family, but in the end my mother was also against it. She accepted the situation and was even happy about her freedom.

**You are married to Linda and have two children together, but you are bisexual and have also had relationships with men. For a while you even lived together with Linda and with your former**

**husband, Mark. Does some of your own unconventional upbringing have an effect on your present marital status?**

I've learned: there's not just one way to be happy in this world. It's worked out surprisingly well for the three of us, mostly because of Mark. When I wanted to start a family and live together with Linda, there was a short crisis, but things quickly eased up. He also found a new relationship. We also had the opportunity at that time to buy a cheap little apartment building in Leipzig, where Mark, Linda with the children and I each had an apartment.

**In 1996, one of your students sequenced DNA from a Neanderthal for the first time. What did you feel at the time?**

It was immediately clear that the DNA sequence being studied was outside the variation of now-living humans and also far from chimpanzees. That was a real eureka moment. But by the time I got home, I was already asking myself, "What's next?" The crucial question was: first, can the result be repeated; second, can we also study DNA in the nucleus? Almost every advance in science raises new questions.

**In 2004, you then were able to study DNA in the cell nucleus, in 2010 you discovered the gene flow from the Neanderthals to modern humans, and in 2014 you decoded the entire genome. What was crucial in getting you this far?**

We have been working systematically on how to most efficiently extract short fragments of bone and sequence them in the lab, and the sequencing technology became much more efficient during that time. You could sequence billions of molecules, cheaply and quickly. And we had a team of talented and very hardworking people.

**Can you say in simple terms what was so groundbreaking about your discovery?**

We contributed to the fact that today you can study genetic evolution over a long period of time, not only in humans, but in animals, plants, bacteria, and viruses. For example, when we discovered that many of us carry genetic variants of the Neanderthal genome. These still have an impact today. In the Corona pandemic, for example, it turned out that an estimated one million deaths were caused by a genetic contribution from the Neanderthals.

**In 2022 you received the Nobel Prize. How has the award changed you?**

I hope not at all. It was really very surprising, and it's still surprising to me when I wake up in the morning and think about it. Winning awards is always an encouragement, of course. However, I am now also often invited just because I am a Nobel laureate, and not because people want to know about our work. Of course, I am still flattered, but I am even more flattered when people are genuinely interested in our work.

**How would you describe your personality?**

I try to think positively, be open-minded and see the good in other people, I'm loyal and think I'm pretty okay myself, some people would even say I'm a bit narcissistic.

**You've done so much research on Neanderthals - can you say what makes humans human?**

I think it has to do with behavior. To me, it's very significant that modern humans, rather than Neanderthals, became so numerous. And spread all over the world, and developed culture and technology that change very quickly. It is a dream to one day understand aspects of this based on

differences between genomes of Neanderthals and humans living now. That's my goal for the next five or ten years.

**Almost forty years have passed since that first moment when you felt you were on the right track in research. How do you look back on that young student?**

With a lot of sympathy. He was very lucky to be in the right place at the right time.

**You were supposed to be retired, but now you are allowed to continue your research in Leipzig until 2028 and also in Japan. What is your relationship with this country?**

I always enjoy visiting Japan and have many friends there. The fact that I can now not only have the part-time job in Japan, but also continue with our group in Leipzig for a few years, is totally great.

**What is your message to the world?**

If I have one at all, it would be: Do what you enjoy doing. Because you probably do that pretty well, and at least you have fun doing it, regardless of what comes out.